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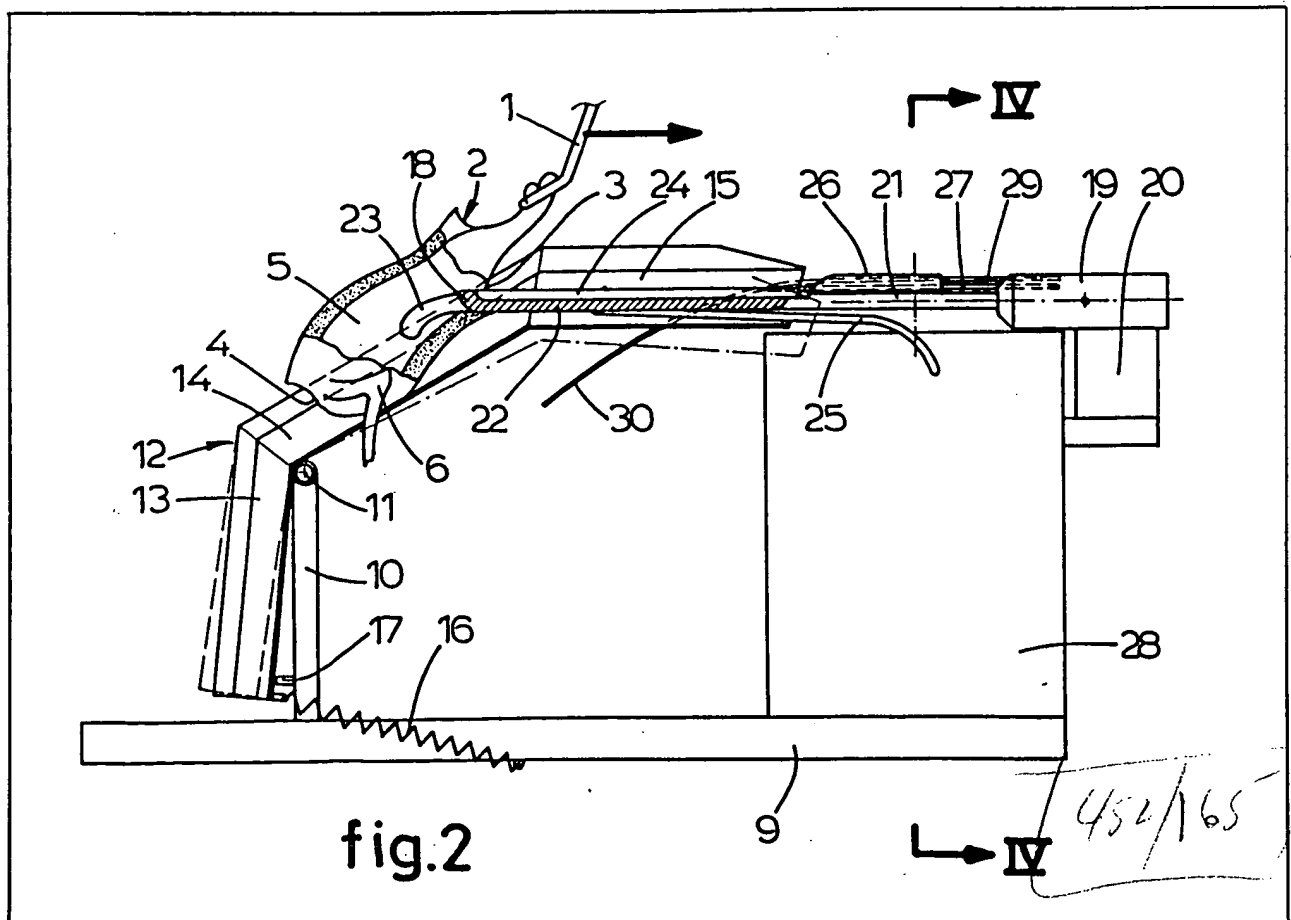
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Service  
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57—60 Lincoln's Inn  
Fields, London WC2A 3LS(54) Apparatus for removing breast  
from eviscerated carcasses of fowl(57) An apparatus for removing the  
breast from the carcass 2 of a fowl  
has a conveyor 1 for advancing the  
carcass, hanging by the legs with the  
breast facing forwards, and a trough-  
like guide channel member 12 for  
supporting and guiding the breast in a  
horizontal position. A mandrel 18  
extends above the member, extending  
past the rear end thereof and having aforward end portion 23 extending in  
the direction facing the advancing  
carcasses whereby this end enters the  
body cavity of each carcass through  
an abdominal opening 3 and leaves  
this cavity through a neck opening 4.  
Guide means 25 are secured to the  
lower side of the mandrel for pressing  
the chest of each carcass downwardly  
from the inside thereof as the latter is  
pulled forwardly on the mandrel. A  
pair of rotating cutting discs 27 are  
arranged on both sides of the guide  
means for removing the breast.

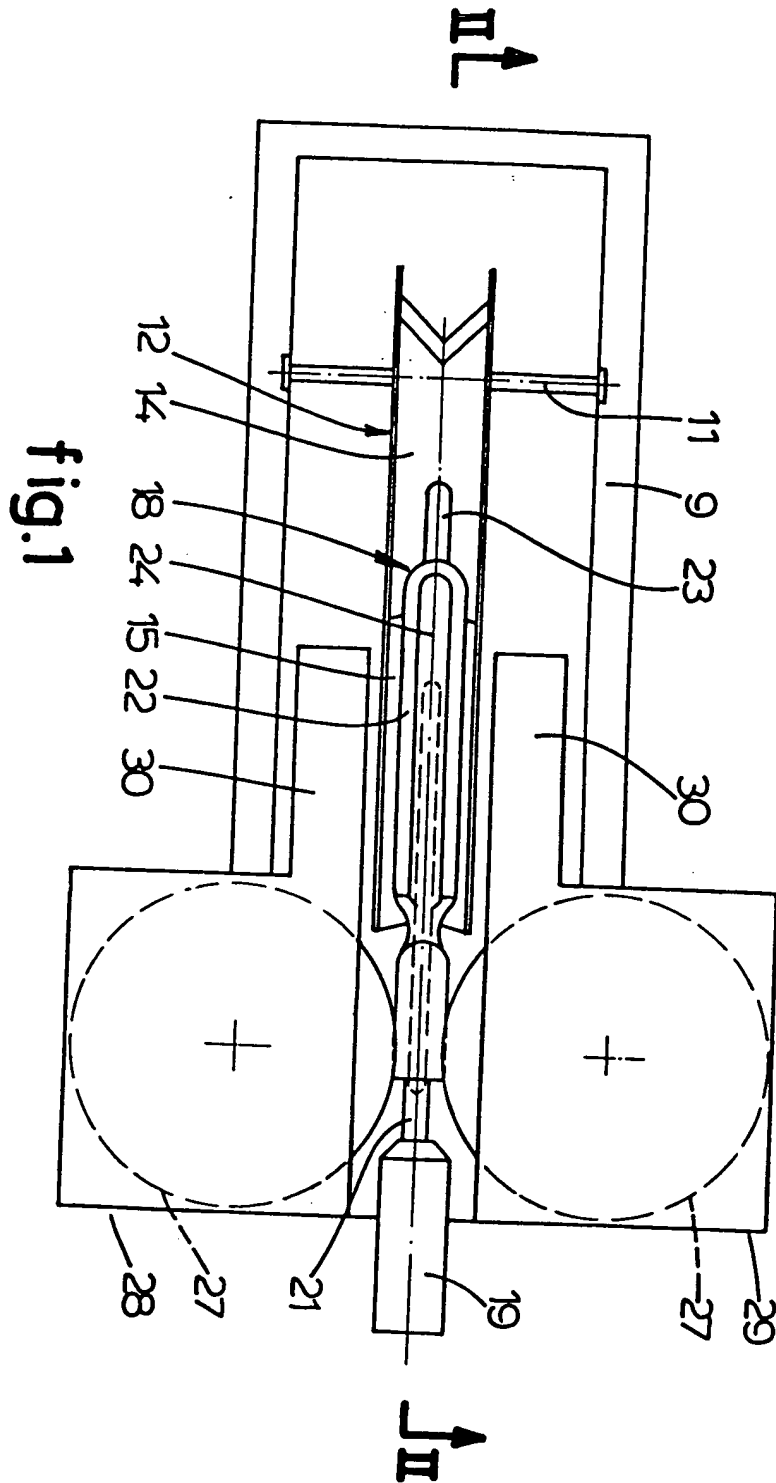


fig.3

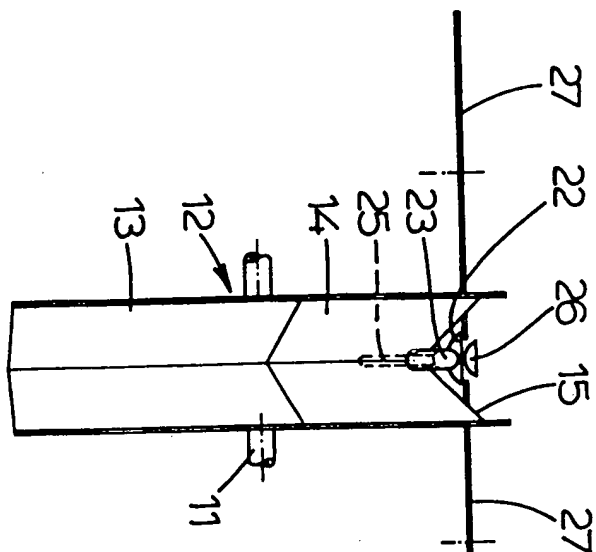
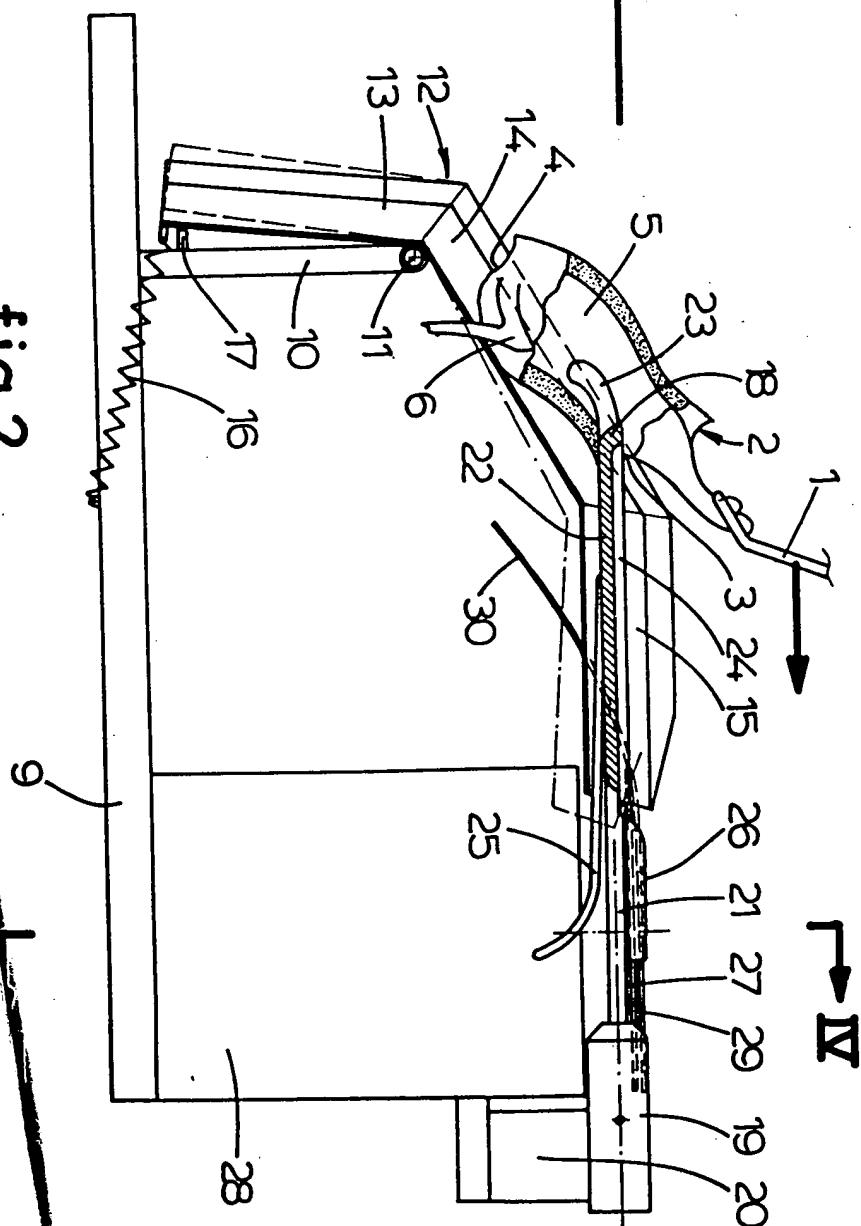


fig.2



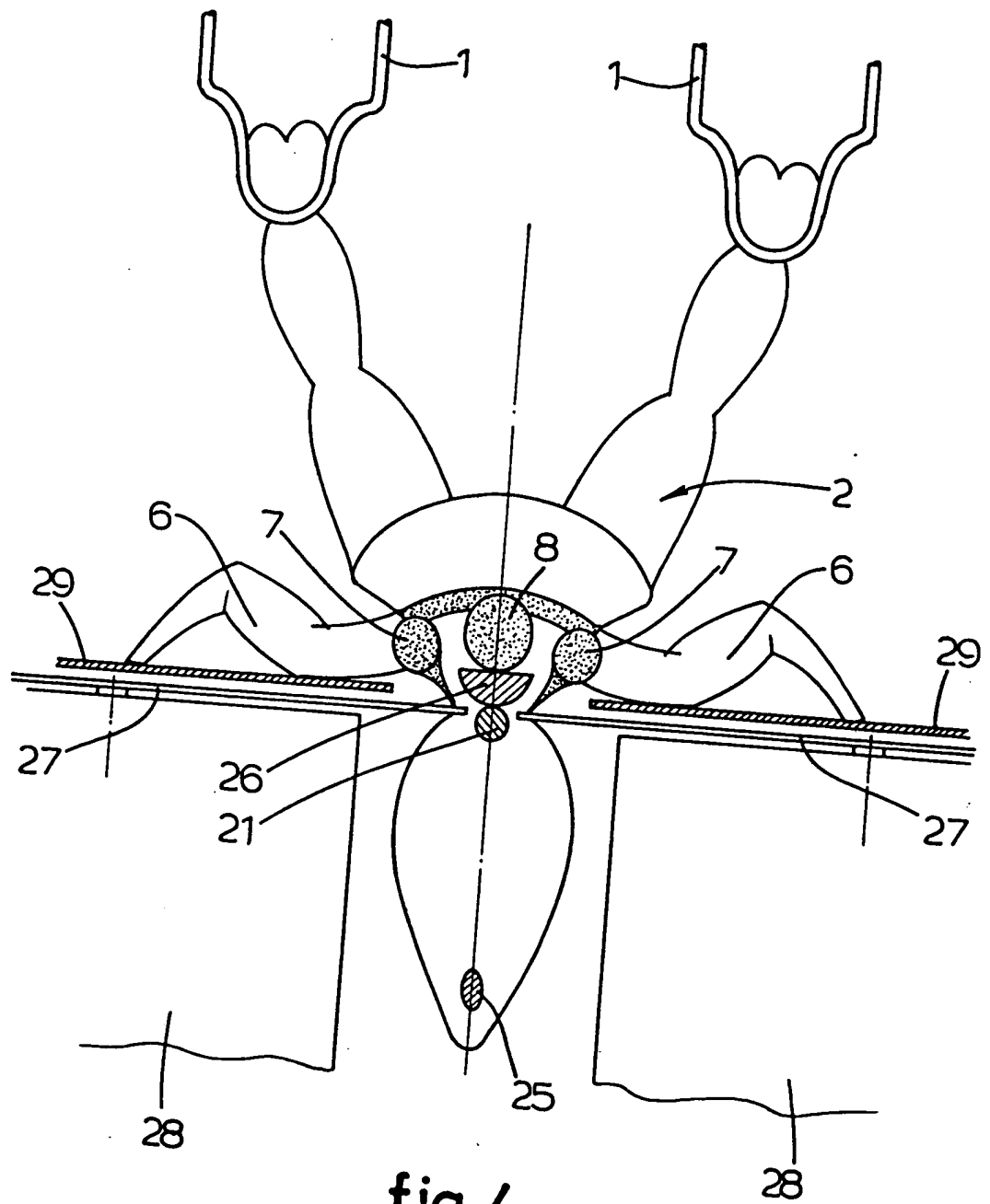


fig. 4

## SPECIFICATION

## Improvements in or relating to apparatuses for removing breasts from eviscerated carcasses of fowl

- 5 The invention relates to an apparatus for removing the breast from the eviscerated carcass of fowl, such as a chicken.

In the course of the eviscerating process of a chicken carcass, normally an abdominal opening and a neck opening are cut in the carcass for the removal of the entrails and other parts, the body cavity thus being accessible through these openings. Generally also the neck and the tail of the bird are removed. In many cases, thereupon the useful component parts of the chicken, such as the wings, legs, and breast components, are removed from the carcass for separate processing and packaging, see for instance U.S. Patent 3,943,600 to Cramer, U.S. Patent 4,270,243 to Lewis and British patent 1,274,742 to Harvey and Cornford. According to these patents, the processing of the eviscerated carcasses in this manner is carried out by automatic means, requiring substantially no manual handling.

10 Typically the carcasses may be delivered to the infeed end of the apparatus concerned by means of an overhead conveyor which supports the carcasses hanging by the legs and, for instance, in a position with the breast facing forwards.

- 15 A problem in an apparatus for automatically removing the breast from the carcasses delivered thereto is that independently of the size of the carcass the meat of the breast should substantially completely removed therefrom with as little useful meat as possible remaining on the carcass so as to avoid losses.

According to the invention, there is provided an apparatus for removing the breast from an eviscerated carcass of a fowl having an abdominal opening and a neck opening cut therein, comprising:

means for conveying the carcass hanging by the legs in a position with the breast part of thereof facing forwards;

a trough-like guide channel member extending below the conveying means for supporting and guiding the breast of an advancing carcass in a substantially horizontal position;

a mandrel longitudinally arranged substantially horizontally above the guide channel member and extending past the rear end of the channel member, the mandrel having a forward portion extending in a direction facing the carcass advanced by the conveying means and arranged to enter the body cavity through the abdominal opening and to leave the cavity through the neck opening of the carcass;

guide means secured to the lower side of the mandrel and extending rearwardly and downwardly past the rear end of the channel member for pressing the chest of the carcass downwardly from the inside thereof as the carcass is moved forwardly on the mandrel by the conveying means; and

- 65 a pair of cutting members arranged to the side of the channel member adjacent and on both sides of the mandrel for cutting and removing the breast from the carcass.

It is thus possible to provide an apparatus for removing the breast from eviscerated chicken carcass which allows substantially complete removal of the breast without any substantial loss of meat and without splintering of the bone of the carcass, even if the size of the chickens delivered by the conveyor varies.

It is also possible to provide such an apparatus having novel means for properly positioning carcasses of varying size with respect to the cutting means used for the removal of the breast.

- 80 It is further possible to provide an apparatus of the kind described which operates quickly and efficiently.

The chicken carcasses advanced by the conveyor are as it were one by one split on a mandrel in which the breast part of the carcass is first held between the channel member on the outside and the mandrel on the inside thereby whereby the breast part is properly centered and held in the proper lateral position, whereupon reaching the end of the channel member the downwardly extending guide means presses the breast part downwardly, whereby the carcass is now supported on the mandrel by its spinal column and the breast part is properly stretched to allow the cutting members to separate the breast part from the remaining part of the carcass cut to the spinal column. The cut-off breast part falls down whereas the remaining part of the carcass is carried off by the conveyor for further processing.

- 100 The present invention will be further described by way of example, with reference to the accompanying drawings, in which

Fig. 1 is a plan view of an apparatus constituting a preferred embodiment of the invention;

Fig. 2 is a vertical longitudinal section on line II—II of Fig. 1;

Fig. 3 is a front view of a guide channel member; and

- 110 Fig. 4 is an enlarged cross-sectional view of the line IV—IV of Fig. 2 illustrating the operation of cutting knives during the separation of the breast part of a chicken carcass.

Referring to the drawings, the apparatus for cutting off the breast of eviscerated chicken carcasses is arranged below an overhead conveyor of known design carrying pairs of hooks 1 regularly spaced lengthwise of the conveyor, one of each pair being arranged beside another in a position in which they can support chicken carcasses 2 by the legs thereof with the breast of the carcasses facing forwardly in the direction of movement of the conveyor indicated by the arrow in Fig. 2. As further schematically shown in Fig. 2, the chicken carcasses each have an abdominal opening 3 and a neck opening 4 both giving access to the eviscerated body cavity 5 of the carcass. These openings 3 and 4 have been formed during prior processing of the carcasses.

in the usual manner. Fig. 4 further shows schematically the wings 6 with wing-joints 7 and the spinal column 8 of the bird.

The apparatus has a frame 9 with posts 10 on which a horizontal transverse shaft 11 is pivotally mounted. Secured to this shaft 11 is a trough-like guide channel member 12 having a lower channel part 13 extending downwardly from the shaft 11 and a middle channel part 14 connected to the lower part 13 and extending upwardly from the shaft 11 at an oblique angle, which middle channel part 14 continues into a rear channel part 15 extending substantially horizontally below the conveyor in the direction of movement thereof. A draw-spring 16 acts on the lower end of the channel member 12 tending to move the latter against a stop 17 defining the rest position of the channel member shown with full lines in Fig. 2. The rearwardly extending channel part 15 can thus be moved from its horizontal rest position towards a lower position, shown with dotted lines in Fig. 2, against the action of the spring 16. The channel parts 13, 14, and 15 have a V-shaped cross-section (see Fig. 3) with vertical side flanges. The guide channel member 12 is arranged at a level below the conveyor hooks 1 such that a chicken carcass 2 delivered by the conveyor to the apparatus first strikes the lower channel part 13 and is centered therein, next slides upwardly through the oblique channel part 14 and finally is pulled through the channel part 15 in a substantially horizontal position with its breast part sliding on the bottom of this channel part.

A mandrel generally indicated by 18 extends through the rear channel part 15 in a horizontal direction and spaced from the channel bottom, the rear end of this mandrel being fixedly mounted in a holder 19. The holder 19 is longitudinally adjustably mounted in a support 20 secured to the frame 9. The mandrel 18 has a rod-like mandrel part 21 of circular cross-section, a middle body part 22 of greater width than the part 21 extending through the horizontal channel part 15 from the rear end thereof and projecting at the opposite side of this channel part 15 for some distance above the oblique middle channel part 14, and a rod-like forward portion 23 of smaller width and having a downward bend with a rounded end. The middle body part 22 of the mandrel is provided on its upper side with a longitudinally extending groove 24.

A guide rod 25 is secured by welding to the lower side of the body part 22 of the mandrel which guide rod projects past the rear end of the rear channel part 15 sloping downward at a small angle and terminating in a downward bend.

An elongate supporting block 26 is secured on the upper side of the mandrel part 21 to the rear of the channel part 15 and above the terminal bend of the guide rod 25. As shown in Fig. 2, this supporting block has a chamfered forward end, a broad flat upper side and a substantially half-circular lower face curving upwardly on both sides of the area where the block 26 is secured to the mandrel part 21 (see Fig. 4).

Two rotating cutting discs 27 are arranged at both sides of the supporting block 26 extending close to or to opposition just below the block 26. The cutting discs 27 are rotated by suitable drive means not shown arranged in boxes 28 supported on the frame 9. Cover plates 29 extend horizontally closely above the cutting discs 27 leaving the inner disc parts adjacent the supporting block 26 freely accessible and having extensions on both sides of the channel member part 15 forming guide plates 30 extending upwardly in the forward direction of the conveyor from a position well below the channel part 15 to the level of the cover plates 29. These guide plates 30 serve to lift the hanging wings 6 of the oncoming birds to the level of the cover plates 29 and thus out of the reach of the cutting discs 27 (Fig. 4).

The apparatus operates as follows.

A chicken carcass delivered to the apparatus by the conveyor on reaching the guide channel member 12 is guided by the channel parts 13 and 14 to the substantially horizontally extending upper channel part 15 in a manner as above described in which the forward mandrel portion 23 with its rounded end enters the abdominal cavity of the carcass and again leaves this cavity through the neck opening 4 whereby the breast part of the carcass is confined between the bottom of the channel part 15 and the broad mandrel body 22. Depending on the size of the chicken carcass the channel part 15 can give way by moving downwardly against the action of the spring 16. The spinal column 8 of the carcass can find a guideway in the longitudinal groove 24 of the mandrel 18 whereby the carcass is held properly centered. When the carcass leaves the channel member part 15 the breast is pressed downwards from the inside of the carcass by the downwardly extending guide rod 25 and is thus stretched whereby the path for the cutting discs is made free to cut off the breast part of the carcass at the highest possible level, i.e. as close as possible to the spine 8. However, because of this downward stretching of the breast part also the wing joints 7 are pulled towards the cutting discs which would prevent a proper cut. The raised supporting block 26 counteracts this undesirable effect by lifting the wing joints 7 to a level above the cut at the desired position between the wings and the *os coracoidum*. In this way it is possible to remove the breast completely with a minimum loss of meat.

The removed breast drops down between the boxes 28 to be moved away by means not shown whereas the remaining part of the chicken carcass is taken along the conveyor for further processing.

If desired it is possible to make the guide rod 25 of resilient material or to pivotally mount this guide rod under the biasing pressure of spring means allowing the end of the rod 25 when engaging the breast of the carcass from the inside to yield to some extent in order to allow a further adaption to the size of the bird.

# CLAIMS

1. An apparatus for removing the breast from an eviscerated carcass of a fowl having an abdominal opening and neck opening cut therein, comprising:
  - means for conveying the carcass hanging by the legs in a position with the breast part thereof facing forwards;
  - the conveying means for supporting and guiding the breast of an advancing carcass in a substantially horizontal position;
  - a mandrel longitudinally arranged substantially horizontally above the guide channel member and extending past the rear end of the channel member, the mandrel having a forward portion freely extending in a direction facing the carcass advanced by the conveying means and arranged to enter the body cavity through the abdominal opening and to leave the cavity through the neck opening of the carcass;
  - guide means secured to the lower side of the mandrel and extending rearwardly and downwardly past the rear end of the channel member for pressing the chest of the carcass downwardly from the inside thereof as the carcass is pulled forwardly on the mandrel by the conveying means; and
  - a pair of cutting members arranged to the rear of the channel member adjacent and on both sides of the mandrel for cutting and removing the breast from the carcass.
2. An apparatus as claimed in claim 1, in which the guide channel member comprises a first part inclined upwardly and rearwardly in the direction of movement of the conveying means, and a second part immediately following the first part and extending substantially horizontally in the direction of conveying movement.
3. An apparatus as claimed in claim 2, in which the guide channel member is pivotally mounted at the first part thereof and is provided with spring means acting on the channel member and tending to rotate the member in a direction in which the second member part moves upwardly, stop means being provided on the channel member to hold the channel member in a rest position in which the second channel member part has a substantially horizontal position.
4. An apparatus as claimed in any one of the preceding claims, in which the guide channel member has a substantially V-shaped cross-section.
5. An apparatus as claimed in claim 2 or 3 or claim 4 when dependent on claim 2, in which the forward portion of the mandrel projects above the inclined first part of the guide channel member.
6. An apparatus as claimed in any one of the preceding claims, in which the forward portion of the mandrel curves slightly downwards and has a rounded forward end.
7. An apparatus as claimed in any one of the preceding claims, in which the mandrel comprises a body portion of increased width and a longitudinally extending groove formed in the upper side of the body portion for guiding and centering the spinal column of the carcass.
8. An apparatus as claimed in claim 7, in which the body portion of the mandrel extends rearwardly substantially up to the rear end of the guide channel member, the mandrel having a rod-like mandrel part of smaller width extending rearwardly from the body portion and having a rear end, means being provided for fixedly supporting the mandrel rear end.
9. An apparatus as claimed in claim 8, further comprising an elongate supporting block member secured to the upper side of the rod-like mandrel part between the two cutting members, the supporting block having a chamfered forward end facing the carcass advanced by the conveying means and serving to lift the wing joints of the carcass to a level above the cutting members.
10. An apparatus as claimed in claim 9, in which the supporting block member has a greater width than the rod-like mandrel part, the block member having a lower side extending upwardly and laterally outwardly on both sides of and away from the rod-like mandrel part, the cutting members projecting inwardly to a position substantially below the lower side of the supporting block member.
11. An apparatus as claimed in any one of the preceding claims, further comprising upwardly inclined guide plates arranged on both sides of the guide channel member for lifting the wings of the advancing carcass, and horizontally extending cover plates arranged closely above the cutting members, the inclined guide plates leading to the cover plates.
12. An apparatus as claimed in any one of the preceding claims, in which the guide means secured to the mandrel comprises a resilient rod member.
13. An apparatus for removing the breast from an eviscerated carcass of a fowl, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.